

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Yuji AKIMOTO et al

For: METHOD FOR MANUFACTURING METAL POWDER

Serial No.: 10/657 569

Group: 1742

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

We, the undersigned, hereby declare as follows:

We are two of the co-inventors of the invention described and claimed in application Serial No. 10/657 569, filed on September 8, 2003.

We hereby incorporate herein the contents of Examples 1-10 and Comparative Examples 1-2 contained in the above-identified patent application.

We have carried out additional tests to illustrate the criticality of the specified V/S in the present invention.

Additional Example A and Comparative Examples A and B

A nickel powder was manufactured in the same manner as in Example 1, except that the cross-sectional area of the opening part of the nozzle was set at 0.32 cm², 0.37 cm² and 0.42 cm², respectively and the V/S was set at 630, 540 and 480, respectively, as shown in Table A, attached thereto.

The characteristics of the powders thus obtained are shown in Table A. Figures A and B, attached hereto, show the


relationship between the V/S and the values of D99.9 and D50 (Table A) and the relationship between the V/S and the ratio of D99.9/D50 for the above nickel powders.

DISCUSSION OF RESULTS

As can be seen from the above results shown in Table A and Figures A and B, the powder obtained by Example A had a small D99.9/D50 ratio of 2.2, as referred to in the case of Examples 1 to 3, and showed a very narrow particle size distribution. On the other hand, in the case of Comparative Examples A and B, the D99.9/D50 ratio for each nickel powder was 2.8 or 3.8, so that the particle size distribution was broader than in the Examples of the present invention. A comparison of the invention examples, especially Example 2 and additional Example A, with Comparative Example 1 and Comparative Examples A and B, shows that the claimed $V/S > 600$ stably provides powders having a narrow particle size distribution and, even if the V/S is slightly below the specified level as in the above comparative cases, any desired narrow particle size distribution cannot be obtained.

We hereby declare that all statements made herein of our own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: November 1, 2005


Yuji AKIMOTO

Dated: November 1, 2005


Kazuro NAGASHIMA

Encl: Table A
 Figure A and Figure B



Table A

	Raw material powder*	Concentration of raw material powder in vapor phase (g/liter)	Cross-sectional area S of nozzle opening part (cm ²)	V/S	Heating temperature (°C)	Characteristics of product powder					
						Composition	Crystallinity	Shape	D50 (μm)	D99.9 (μm)	D99.9 /D50
Example 1	A	0.4	0.13	1500	1550	Ni	Single crystal	True spherical	0.51	1.1	2.2
Example 2	A	0.4	0.30	670	1550	Ni	Single crystal	True spherical	0.57	1.3	2.3
Example 3	A	0.4	0.03	6700	1550	Ni	Single crystal	True spherical	0.46	1.0	2.2
Example A	A	0.4	0.32	630	1550	Ni	Single crystal	True spherical	0.58	1.3	2.2
Comp. Example A	A	0.4	0.37	540	1550	Ni	Single crystal	True spherical	0.60	1.7	2.8
Comp. Example B	A	0.4	0.42	480	1550	Ni	Single crystal	True spherical	0.68	2.6	3.8
Comp. Example 1	A	0.4	0.50	400	1550	Ni	Single crystal	True spherical	0.74	3.9	5.3

Note: * A: Nickel acetate tetrahydrate powder

Figure A

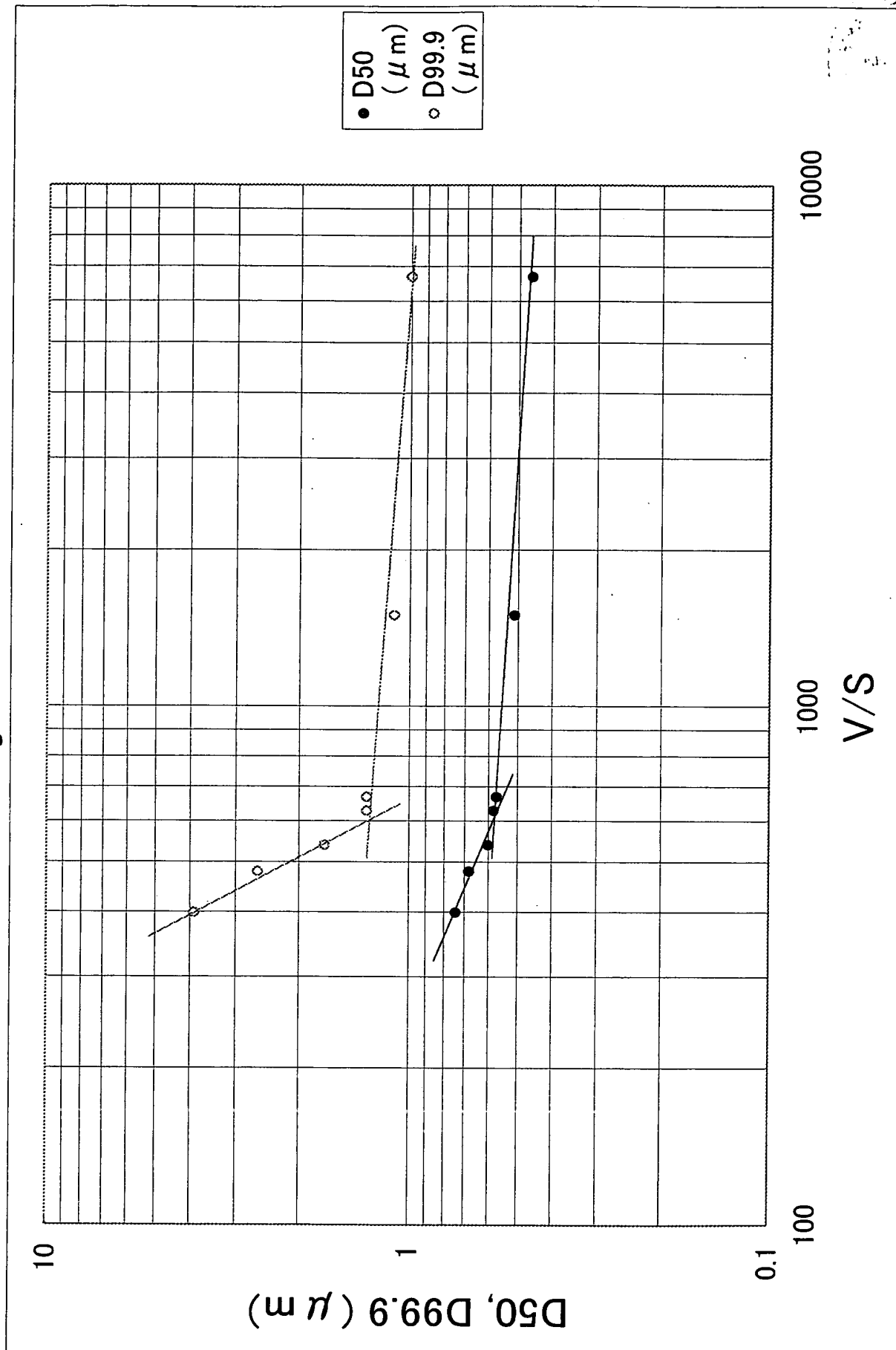


Figure B

